

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Claims 1-20 have been rejected. Claim 17 has been amended. No new matter has been added by this amendment. Accordingly, Claims 1-20 remain pending in the present application.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Specification

Paragraph [0001] of the Specification has been amended to add the application serial number and filing date for a related patent application.

Claim Rejections – 35 U.S.C. § 112

On page 2 of the Office Action, Claims 5-7 and 15-20 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner stated:

The term “low” in claims 5-7, and 15-18, is a relative term, which renders the claims indefinite. The term “low” is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. If applicant intends a particular temperature, it should be clearly recited.

The present specification includes the following description (with emphasis added):

[0039] In one embodiment, layer 64 is a layer of conductive or semiconductive material having a thickness of between approximately 50 and 200 Å. In one embodiment, layer 64 can be a layer of tantalum nitride (TaN), titanium nitride (TiN), tungsten nitride (WN), titanium/ titanium nitride (Ti/TiN). Layer 64 can be deposited by sputtering or by CVD. The

materials for layer 64 are chosen for their relatively high temperature stability and etch capabilities. Preferably, layers 47 and 64 are deposited in a low temperature process (e.g., less than approximately 800°C) to reduce germanium outgassing associated with layer 16 and substrate 14. For example, layer 64 may be deposited using a reactive sputtering or CVD process.

Accordingly, the Applicants submit that the specification provides a standard for ascertaining the requisite degree of the “low temperature,” and one of ordinary skill in the art would be reasonably apprised of the scope of the invention. Reconsideration and withdrawal of the rejection of Claims 5-7 and 15-20 under 35 U.S.C. § 112, second paragraph, is respectfully requested.

Claim Rejections – 35 U.S.C. § 102

On page 2 of the Office Action, Claims 1-5 and 7-17 were rejected under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent Application Publication No. 2002/0098689 to Chong et al. The Applicants respectfully traverse these rejections.

Claim 1 recites, among other limitations, “forming a first layer above the gate structure and above the substrate; forming a second layer above the first layer; and doping source and drain regions through the first layer and the second layer.”

Chong et al. does not disclose “doping source and drain regions through the first layer and the second layer” as recited in independent Claim 1. The Examiner indicated that Chong et al. discloses “forming by CVD a first layer 20” and “forming by CVD a second layer 30.” However, it is clear from Figures 4-6 and paragraphs [0022]-[0024] of Chong et al. that the “ion implantation (28)” is performed after the step shown in Figure 5, in which “the dielectric layer 20” is “anisotropically etched to form sidewall spacers.” Thus, the “ion implantation (28)” does not dope source and drain regions through the “first layer 20” as suggested in the Office Action, but instead is implanted into the substrate (labeled “10”) in areas where the “first layer 20” has been removed. Accordingly, Chong et al. does not disclose “doping source and drain regions through the first layer and the second layer” as recited in independent Claim 1.

The rejection of Claims 1-5 and 7-8 should be withdrawn, because at least one limitation of independent Claim 1 is not identically disclosed by Chong et al. Accordingly, the Applicants request reconsideration and withdrawal of the rejection of Claims 1-5 and 7-17 under 35 U.S.C. § 102(a).

Independent Claim 9 recites, among other limitations, “providing a first layer . . . above the strained semiconductor layer” and “providing a second layer above the first layer.”

Chong et al. does not disclose providing a “first layer” and a “second layer” above a “strained semiconductor layer,” as recited in independent Claim 9. As shown in Figure 4 and described in paragraph [0022] of Chong et al., the “dielectric layer (20)” is formed over a “silicon substrate (10).” Again, as shown in Figures 5 and 6 and described in paragraphs [0023]-[0024] of Chong et al., it is only after the “dielectric layer 20” is “anisotropically etched to form sidewall spacers” that the “ion implantation (28)” is performed which “consists of Si, Ge or Ar ions implanted so as to break lattice bonds and non-crystalline or amorphous silicon layer in the silicon substrate (10).” Accordingly, Chong et al. does not disclose providing a “first layer” and a “second layer” above a “strained semiconductor layer,” as recited in independent Claim 9.

The rejection of Claims 9-16 should be withdrawn, because at least one limitation of independent Claim 9 is not identically disclosed by Chong et al. Accordingly, the Applicants request reconsideration and withdrawal of the rejection of Claims 9-16 under 35 U.S.C. § 102(a).

Independent Claim 17 (as amended) recites, among other limitations, “doping the germanium containing layer through the first layer to form source and drain regions.”

Chong et al. does not disclose “doping” a “germanium containing layer” through a “first layer of insulative material” to “form source and drain regions.” As shown in Figures 10 and described in paragraph [0024] and [0027]-[0029] of Chong et al., after the “ion implantation (28)” is performed which “consists of Si, Ge or Ar ions,” a “metal layer (30)” and a “capping layer (32)” are provided. Because “metal layer (30)” is not an “insulative material,” the “ion implantation process (34)” does not dope the “substrate (10)” through a

“first layer of insulative material” as recited in Claim 17. Further, once the “capping layer (32)” is provided, Chong et al. does not disclose any subsequent doping steps, but rather a “laser irradiation (36).” Accordingly, Chong et al. does not disclose “doping” a “germanium containing layer” through a “first layer of insulative material” to “form source and drain regions,” as recited in amended Claim 17.

The rejection of Claim 17 should be withdrawn, because at least one limitation of this claim is not identically disclosed by Chong et al. Accordingly, the Applicants request reconsideration and withdrawal of the rejection of Claim 17 under 35 U.S.C. § 102(a).

The Applicants also note that various dependent claims are also allowable for reasons in addition to those described above. For example, Claim 2 recites “annealing the substrate where the first layer and second layer prevent outgassing.” Chong et al. does not disclose first layers and second layers which prevent outgassing during an annealing step. Accordingly, Claim 2 is allowable over Chong et al.

Claim 5 recites “wherein the step of forming a first layer and forming a second layer utilize low temperature deposition.” Claim 15 recites “wherein the first layer is deposited in a low temperature process.” Claim 16 recites “wherein the layer containing titanium, nitrogen, tantalum or carbon is provided in a low temperature process.” Chong et al. does not disclose the use of a low temperature process as that term is used in the present application in the formation of the layers labeled (20) and (30). Accordingly, Claims 5, 15, and 16 are allowable over Chong et al.

Claim Rejections – 35 U.S.C. § 103(a)

On page 3 of the Office Action, Claims 6 and 18-20 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Chong et al. in view of U.S. Patent No. 6,306,722 to Yang et al. The Applicants respectfully traverse this rejection.

As an initial matter, the Applicants submit that the Examiner has not established a proper motivation to combine the teachings of Chong et al. with those of Yang et al. The Office Action stated that “It would have been within the scope of one of ordinary skill in the

art to combine the teachings of Chong et al and Yang et al to enable the step of forming first layer 20 of Chong et al to be performed.”

As noted in M.P.E.P. § 2143.01, “The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination” (citing In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)). The Examiner has not provided any evidence that one of skill in the art would have been motivated to make the combination suggested by the Examiner. Instead, the Examiner appears to have chosen elements from otherwise unrelated references in making the combination of Chong et al. and Yang et al. and engaged in hindsight reasoning using the Applicants’ own disclosure as a roadmap. Such reasoning is improper, and the rejection of Claims 6 and 18-20 should be withdrawn.

Even if the combination of Chong et al. and Yang et al. were proper, at least one element of each of rejected Claims 6 and 18-20 is not taught or suggested by the combination of Chong et al. and Yang et al.

As described above, independent Claim 1 (from which Claim 6 depends) recites, among other limitations, “forming a first layer above the gate structure and above the substrate; forming a second layer above the first layer; and doping source and drain regions through the first layer and the second layer.”

Neither Chong et al. nor Yang et al., alone or in any proper combination, teach or suggest “forming a first layer above the gate structure and above the substrate; forming a second layer above the first layer; and doping source and drain regions through the first layer and the second layer.” Chong et al. does not teach or suggest “doping source and drain regions through the first layer and the second layer,” as recited in Claim 1. As described above, the “ion implantation (28)” of Chong et al. does not dope source and drain regions through the “first layer 20” as suggested in the Office Action, but instead is implanted into the substrate (labeled “10”) in areas where the “first layer 20” has been removed (see, e.g., Figure 6). Yang et al. also does not teach or suggest “doping source and drain regions through the first layer and the second layer,” and the Examiner has not pointed to any such teaching or

suggestion. Accordingly, neither Chong et al. nor Yang et al., alone or in any proper combination, teach or suggest “doping source and drain regions through the first layer and the second layer,” as recited in Claim 1.

Independent Claim 17 (as amended), from which Claims 18-20 depend, recites, among other limitations, “doping the germanium containing layer through the first layer to form source and drain regions.”

Neither Chong et al. nor Yang et al., alone or in any proper combination, teach or suggest “doping the germanium containing layer through the first layer to form source and drain regions.” As described above, Chong et al. does not disclose “doping” a “germanium containing layer” through a “first layer of insulative material” to “form source and drain regions,” as recited in amended Claim 17. Nor is there any teaching or suggestion provided by Chong et al. that would suggest modifying the teachings of Chong et al. in this manner. The Applicants submit that such motivation also is not provided by Yang et al., which does not teach or suggest “doping the germanium containing layer through the first layer to form source and drain regions” as recited in independent Claim 17 (as amended).

The rejection of Claims 6 and 18-20 should be withdrawn, because at least one limitation of independent Claims 1 and 17 are not taught or suggested by Chong et al. and Yang et al., either alone or in proper combination. Accordingly, the Applicants request reconsideration and withdrawal of the rejection of Claims 6 and 18-20 under 35 U.S.C. § 103(a).

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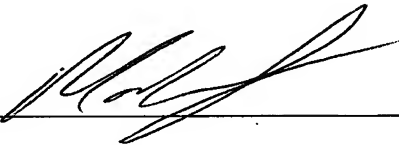
It is submitted that each outstanding objection and rejection to the Application has been overcome, and that the Application is in a condition for allowance. Claims 1-20 will be pending in this Application. The Applicants request consideration and allowance of all pending Claims 1-20.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 06-1447. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1447. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 06-1447.

Respectfully submitted,

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